MASTER'S THESIS

De relatie tussen de Big-5 persoonlijkheidskenmerken en innovatief leerkrachtgedrag met ICT en het gedeeltelijk mediërende effect van work engagement.

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De relatie tussen de Big-5 persoonlijkheidskenmerken en innovatief leerkrachtgedrag met ICT en het gedeeltelijk mediërende effect van work engagement.

The relationship between the Big-5 personality traits and innovative teaching behaviour with ICT and the partial mediating effect of work engagement.

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Preface (in Dutch)

Voor u ligt mijn thesis: ‘the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT and the partial mediating effect of work engagement’. Deze thesis is geschreven in het kader van mijn afstuderen aan de opleiding onderwijswetenschappen aan de Open Universiteit, en in opdracht van de afdeling onderwijs & kwaliteit van het Deltion College in Zwolle.

De keuze voor het onderwerp komt voort uit mijn achtergrond in de hulpverlening en de opleiding gedragswetenschappen, waardoor ik geïnteresseerd ben in menselijk gedrag en de invloed van het gedrag op de omgeving. Vanuit mijn huidige rol als mbo-leraar en door de master onderwijswetenschappen zag ik de huidige ontwikkelingen rondom digitalisering en de veranderende arbeidsmarkt van dichtbij. Hierdoor heb ik ervoor gekozen om een combinatie te maken tussen onderzoek naar persoonlijkheid en de huidige onderwijsontwikkelingen in het mbo: innovatief gedrag van leraren en het gebruik van digitale leermiddelen.

Het afstudeerproces heb ik ervaren als een proces waarin alle vaardigheden die ik geleerd heb in de afgelopen jaren samenkomen. Ik vond het leuk om mij te storten op een actueel onderwerp waarbij veel ROC’s nog worstelen met de implementatie. Het beroepsonderwijs is tenslotte aan het veranderen in een instituut die de student voorbereidt op een ‘leven lang leren’. Het gebruik van digitale leermiddelen wordt onvermijdelijk. Voor mij was het leerzaam om deze ontwikkeling te vatten in concrete statistische cijfers en die te onderbouwen in de conclusie. Vooral het proces van argumenteren vond ik leerzaam.

Graag wil ik een aantal personen in het bijzonder bedanken voor hun bijdrage aan mijn afstudeerproces. Allereerst wil ik dr. Arnoud Evers bedanken voor zijn begeleiding bij het schrijven van het onderzoeksvoorstel. Door zijn deskundige begeleiding heb ik vanuit een brede oriëntatie een sterk voorstel kunnen schrijven. Ook wil dr. Rob Martens bedanken voor zijn begeleiding bij de uitvoerende fase. Zijn feedback op mijn stukken was inhoudelijk, kundig en de feedback zorgde ervoor dat ik de thesis goed af heb kunnen ronden. Tevens wil ik de collega’s AnneMarie Versloot en JaapJan Vroom van de afdeling onderwijs & kwaliteit bedanken voor dat ze mij de mogelijkheid hebben gegeven om mijn afstudeeronderzoek binnen Deltion College uit te voeren. Ik heb hun steun, hulp en vertrouwen als zeer prettig ervaren.

Ik wens u veel plezier bij het lezen van mijn thesis.

Raymond Rutgers
Oosterstreek, 7 juli 2019.

De relatie tussen de Big-5 persoonlijkheidskenmerken openheid voor ervaring, zorgvuldigheid, extraversie, inschikkelijkheid, en emotionele stabiliteit en innovatief leerkrachtgedrag met ICT en het gedeeltelijk mediërende effect van work engagement.

Raymond Rutgers

Samenvatting

Het beroepsonderwijs in Nederland is snel aan het veranderen vanwege het effect van de technologische invloeden op de samenleving. Het gebruik van digitale leermiddelen (ICT) wordt onvermijdelijk, waardoor het, om te kunnen innoveren, van belang is dat de leraar innovatief leerkrachtgedrag met ICT laten zien. Aangezien men over leerkrachtgedrag spreekt, staat de persoonlijkheid en work engagement van de leraar mogelijk in verband met het innovatieproces. Daarom richt de huidige studie zich op de relatie tussen de Big-5 persoonlijkheidskenmerken en innovatief leerkrachtgedrag met ICT. Aangezien er in voorgaande studies een positieve relatie is gevonden tussen de Big-5 persoonlijkheidskenmerken en work engagement en een positieve relatie tussen work engagement en innovatief leerkrachtgedrag, is work engagement onderzocht als mogelijke gedeeltelijke mediator. In totaal werden door middel van willekeurige selectie 210 leraren gerekruteerd vanuit een regionaal opleidingscentrum (roc) in een middelgrote stad in Nederland. De school bestaat uit zeven afdelingen, waarvan alleen leraren uit de zes niet-ICT-gerelateerde afdelingen zijn geselecteerd. Per afdeling werden aselect 35 leraren geselecteerd. In totaal vulden 148 deelnemers de vragenlijst in. Na het verwijderen van de ontbrekende gegevens en outliers werden 145 deelnemers geanalyseerd, 70 mannen (48%) en 75 vrouwen (52%). De deelnemers vulden een enquête in met daarin (1) de Big Five Inventory-25 (Gerlitz & Schupp, 2005) om de Big-5 persoonlijkheidskenmerken openheid voor ervaring, zorgvuldigheid, extraversie, inschikkelijkheid en neuroticisme te meten, (2) de Utrechtse Bevlogenheid Schaal-9 (UBES-9) (Schaufeli, Bakker, & Salanova, 2006) die work engagement meet en (3) de innovatieve leerkrachtgedrag met ICT-subschaal (Chou, Shen, Hsiao, & Shen, 2018) om innovatief leerkrachtgedrag met ICT te meten. De data werd geanalyseerd met behulp van een multivariate hiërarchische regressieanalyse. Uit de resultaten blijkt een significant positief verband tussen openheid voor ervaring en innovatief leerkrachtgedrag met ICT en geen positief verband tussen zorgvuldigheid, extraversie, inschikkelijkheid en emotionele stabiliteit en innovatief leerkrachtgedrag met ICT. Er was een significant positief verband tussen emotionele stabiliteit en work engagement. Er was geen verband tussen work engagement en innovatief leerkrachtgedrag met ICT. Work engagement was niet gerelateerd aan innovatief leerkrachtgedrag met ICT, waardoor work engagement de associatie tussen de Big-5 persoonlijkheidskenmerken en innovatief gedrag met ICT niet gedeeltelijk medieerde. Toekomstige studies kunnen de afdeling 'Design, Media & ICT' in de analyse opnemen om inzicht te krijgen in de mogelijke verschillen tussen deze afdeling en andere afdelingen. Daarnaast kan een 'top-down'-benadering gebruikt kunnen worden in plaats van een' bottom-up'-benadering om inzicht te krijgen in de perceptie van de leraar over

innovatief onderwijs. Als laatste kan worden onderzocht of ‘job crafting’ invloed heeft op de relatie tussen de Big-5 persoonlijkheidskenmerken en innovatief leerkrachtgedrag met ICT aangezien innovatie met ICT nog in de functiebeschrijving van de leraar is opgenomen.

Keywords
Innovative teaching behaviour with ICT, work engagement, five factor model of personality (Big-5)

The relationship between the Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and innovative teaching behaviour with ICT and the partial mediating effect of work engagement.

Raymond Rutgers

Summary

Vocational education in the Netherlands is rapidly changing due to the technological influences that affect society. The use of digital learning tools (ICT) becomes inevitable and in order to innovate, the teacher needs to demonstrate innovative teaching behaviour with ICT. Since behaviour plays a role, the teachers associated personality and work engagement possibly relate to the innovation process. Hence, the present study analyses the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT. Since there is a positive relationship between the Big-5 personality traits and work engagement and a positive relationship between work engagement and innovative teaching behaviour, work engagement was considered as a partial mediator. In total 210 participants were recruited by random selection from a population of teachers teaching in vocational education working in one vocational education school in a average sized city in the Netherlands. The school consists of seven departments from which only teachers out of the six not ICT-related departments were selected. 35 teachers were selected using a stratified a-select sample per department. In total 148 participants filled in the questionnaire. After removing the missing data and outliers 145 participants remained to be analysed, 70 males (48%) and 75 females (52%). The participants completed a survey that included (1) the Big Five Inventory-25 (Gerlitz & Schupp, 2005) to measure the Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness and neuroticism, (2) the Utrechtse Bevlogenheid Schaal-9 (UBES-9) (Schaufeli, Bakker, & Salanova, 2006) that measures work engagement and (3) the innovative teaching behaviour with ICT subscale (Chou, Shen, Hsiao, & Shen, 2018). The data was analysed using a multivariate hierarchical regression analysis. The results show there was a significant positive association between openness to experience and innovative teaching behaviour with ICT and no positive association between conscientiousness, extraversion, agreeableness and emotional stability and innovative teaching behaviour with ICT. There was a significant positive association between emotional stability and work engagement. There was no association between work engagement and innovative teaching behaviour with ICT. Work engagement was not related to innovative teaching behaviour with ICT. Therefore, work engagement did not mediate any associations between the Big-5 personality traits and innovative behaviour with ICT. Future studies could include the department ‘Design, Media & ICT’ to gain insight in the possible differences between this department and other departments. A ‘top-down’ approach could also be utilised instead of a ‘bottom-up’ approach in order to gain insight in the perception of the teacher about innovative teaching. Lastly, it can be studies whether ‘job crafting’ influences the relationship

between the Big-5 personality traits and innovative teaching behaviour with ICT since innovation with ICT is included in the job description of the teacher yet.

Keywords
Innovative teaching behaviour with ICT, work engagement, five factor model of personality (Big-5)

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1. Introduction

1.1.1 Research objective

Due to the technological innovations in the past decades, the world is rapidly changing (Magana, 2017, pp. 34-41). These changes in society affect, among other things, the vocational education in the Netherlands by adapting it into an environment of teaching and learning that makes students lifelong learners. This prepares them for the rapidly changing 21st century workplace in which innovative behaviour of employees is required (De Clercq, Dimov, & Belausteguigoitia, 2016; Groff, 2013). As a result, these changes in teaching require that educators in vocational education come up with, and consistently use digital learning tools in their teaching in order to improve students learning (Magana, 2017; Istance, & Kools, 2013). The use of Information Communication Technology (ICT) in the classroom becomes more relevant and important in order to enhance students learning (Villalba, Castilla, & Redondo, 2018)

While the use of digital learning materials (ICT) is unavoidable in order to improve students learning in the 21st century, Chou, Shen, Hsiao and Shen (2018) operationalized the concept of innovative teaching behaviour with ICT. They define the concept as the intentional behaviour of teachers, who make an effort to integrate ICT into their own innovative teaching material and their behaviour that influences student's innovative behaviour. Innovative teaching behaviour includes deliberate actions aiming to stimulate ideas and daily behaviour using ICT. However, this adoption and implementation of ICT in the classroom by teachers is by no means easy. It requires important skills and competencies. According to Guerriero (2017), European teachers lack the expertise and flexibility required to tackle innovation challenges, including implementing ICT in their teaching in order to enhance students learning. They highlight the importance of teacher challenges like updating teaching methods, employing innovation in their practices and using various sources of knowledge in the process of implementing innovative teaching. In order to overcome these innovation challenges, the teacher needs to apply innovative teaching behaviour. Since European teachers lack the proficiency and flexibility to apply innovative teaching behaviour, fewer studies have studied which factors can help improve teachers' innovative teaching. Examples of the factors studied are the relationship between an innovative climate and innovative teaching behaviour (Balkar, 2015), the relationship between principal empowering leadership to enhance innovative teaching behaviour (Gkorezis, 2016), the relationship between self-efficacy, leader member exchange (LMX), and collective efficacy on innovative behaviour (Hoe-Chang & Hee-Young, 2015), the relationship between the employees' extraversion and employees' innovative behaviour and the moderating effect of organizational innovative climate on that relationship (Luo, Cao, Yin, Zhang, & Wang, 2018), and lastly, the relationship between the basic psychological need satisfaction, intrinsic motivation, and occupational self-efficacy on innovative behaviour (Klaeijsen, Vermeulen, & Martens, 2018).

To enhance the adoption and implementation of ICT in the classroom, two important factors were found that encourage teachers to apply innovative teaching behaviour. The first factor concerns teacher's personality traits, commonly measured using the five-factor model of personality (Big Five) (Digman, 1990). Since the teacher himself plays a key role in implementing innovation challenges (Guerriero, 2017), the personality traits of the teacher may provoke innovative teaching behaviour since Ali (2018) found a positively significant association between the personality traits extraversion, agreeableness, conscientiousness, and openness to experience on individual innovativeness, while 'neuroticism' is negatively correlated to innovative teaching behaviour.

The second factor found is work engagement. From a sample of 1050 adult workers across a wide range of sectors the Big-5 personality traits openness to experience, conscientiousness, extraversion, and agreeableness are positively related to work engagement while the trait neuroticism is negatively related to work engagement (Akhtar, Boustani, Tsivrikos, & Chamorro-Premuzic, 2015). Interestingly, work engagement is also positively correlated to innovative teaching behaviour (Wang et al., 2019). The willingness and motivation to apply innovative teaching methods requires commitment and engagement of a teacher. As previous studies have found a relationship between the Big-5 personality traits and work engagement (Young, Glerum, Wang, & Joseph, 2018), and a relationship between work engagement and innovative behaviour (Agarwal, Datta, Blake-Beard, & Bhargava, 2012; Klaeijsen et al., 2018). It could be suggested that work engagement partially mediates the relationship between the Big-5 personality traits and innovative teaching behaviour using ICT. Therefore, the present study will include work engagement as a possible partial mediator.

Thus far, there are no studies to be found that study the relationship between the Big-5 personality traits, work engagement and teachers utilising innovative teaching behaviour with ICT (Chou et al., 2018; Thurlings, Evers, & Vermeulen, 2015). Therefore, the goal of this study is to expand the current knowledge about innovative teaching behaviour with ICT by examining its relationship with the five-factor model of personality (Big Five) and the partial mediating factor of work engagement. This leads to the following research question: 'what is the relationship between Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and innovative teaching behaviour with ICT and does work engagement partially mediate the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT?' The present study aims to supplement the existing literature concerning innovative teaching behaviour with ICT described by Chou et al. (2018), by studying the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT. This study aims to contribute to this area of research by exploring the influence of the teacher's personality on innovative teaching behaviour with ICT and the partial mediating factor work engagement. In addition, understanding the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT will help to identify factors that enhance or weaken the use of digital learning tools (ICT) by educators in their teaching. The practical relevance of the present study is that resources in education are limited, so

managers in education have to gain insight in which teachers to provide with the limited ICT-tools available in order to innovate their teaching with ICT. In addition, managers may stimulate the teacher with certain personality traits to use digital learning tools (ICT), or the manager can try to increase the work engagement of teachers in order to enhance innovative teaching with ICT.

The following section will describe innovative teaching behaviour, followed by innovative teaching behaviour with ICT. Next, the Big-5 personality traits will be explained, followed by a more in-depth examination of the relationship between the Big-5 personality traits and innovative teaching behaviour (with ICT). Lastly, the possible partial mediating effects of work engagement will be discussed.

1.2 Theoretical framework

1.2.1. Innovative teaching behaviour

The most commonly used definition of innovative behaviour in general is described by Thurlings et al. (2015), namely: a three-stage process in which an individual recognizes a problem for which she or he generates a new (novel or adopted) idea and solution. The three stages the individual follows are: (a) intentional idea generation, (b) idea promotion, and (c) idea realization. These stages are performed within a work role, work group, or organization, in order to benefit role performance, the group, or the organization. As the educational field is rapidly shifting, factors associated with teachers applying innovative behaviour are widely researched on both a 'micro' and 'meso' level. The micro level includes factors affecting the individual teacher and the meso level includes the department and the subject discipline (Norton, 2018). On the micro level, Klaeijsen et al. (2018) studied the relationship between the self-determination theory, including both intrinsic motivation and basic psychological need satisfaction on innovative behaviour. It was concluded that intrinsic motivation and occupational self-efficacy have a direct effect on innovative behaviour. Furthermore, the study of Balkar (2015) indicated on a meso level that the organizational climate, when there is support, fairness and pressure, affected teachers' job performance. To be more specific, when an organizational climate includes support and pressure, the teacher's innovative behaviour was affected, and innovative behaviour has an effect on the teacher's job performance. It can be concluded that the organizational climate in the department effects innovative behaviour of teachers. Additionally, Thurlings et al. (2015) found multiple studies that have been conducted to study innovative behaviour with ICT integration in the classroom or the curriculum. These findings indicate there is a need to study innovative teaching behaviour and the integration of ICT in the classroom or curriculum.

1.2.2. Innovative teaching behaviour with ICT

As mentioned above, Thurlings et al. (2015) found studies that specifically study innovative behaviour with ICT integration in the classroom or in the curriculum. Examples of this innovative teaching behaviour with ICT mentioned are gamification, e-learning and virtual reality. These examples of

innovative teaching behaviour with ICT will be explained briefly. Gamification is an educational approach that uses for instance a videogame design and game elements in learning environments in order to motivate students and to enhance students learning (Bourgonjon et al., 2013). In their meta-analysis Baptista and Oliveira (2018) found that gamification is a useful instrument and the use is best predicted by the usefulness of the game, the ease of use, the enjoyment of playing the game and the games attitude towards gamification. Stott and Neustaedter (2013) state that in applying gamification, the teacher has to be cautious in considering which context they are teaching. They should know who their students are and should keep the shared goals of the class in mind. The teacher must also give himself freedom to fail in order to implement gamification successfully.

Besides gamification, e-learning is an example of innovative teaching. In e-learning the student engages in digital learning activities in which interactive use is made of a computer connected to a computer network (Donnelly, McGarr, & O'Reilly, 2011). E-learning has the following three characteristics (1) the nature of the learning experiences, (2) participation synchronicity, and (3) the absence or presence of face-to-face instruction. The nature of the learning experiences can be didactic or active. Didactic means the learning content is literally handed over to the student and the student is not able to change the learning content. The teacher develops the e-learning tool beforehand and does not have to interact on the spot with the student. Active means the student is in control over the learning content and is able to change the content. The teacher needs to oversee the student's work. When the learning content is taught on the spot or face-to-face via digital tools, the learning is called synchronous. The teacher must be present in order to respond to the student immediately. When there is a time difference between the instruction and the teacher's response, the learning is a-synchronous. The teacher is able to choose the moment of response. Lastly, the absence or presence of face-to-face instruction includes the interaction between the students using audio-visual tools like chat, virtual classrooms and audio/video conferencing. E-learning consists of full learning or blended or mixed learning. Full learning means there is no physical contact of any sort between the participants. Blended or mixed learning includes physical and virtual contact between the participants (Dhir, Verma, Batta, & Mishra, 2017). Although more research is recommended, e-learning gives the impression of being an appropriate method to generate learning outcomes. This is demonstrated in the meta-analysis of Voutilainen, Saaranen, and Sormunen (2017) in which healthcare professionals tought via e-learning programmes had a higher testscore compared with a group that were not tought via e-learning programmes.

Lastly, virtual reality is implemented by a combination of technologies used by a student in order to visualize and provide interaction with a virtual learning environment (Loogma, Kruusvall, & Ümarik, 2012). Virtual reality consists of five key elements (1) the participants, (2) the creators, (3) virtual world, (4) immersion, and (5) interactivity. Virtual reality is a means of interaction between people, which makes the participants and creators key elements. Every participant brings his or her own capabilities, interpretations, history and background in the virtual learning environment. Hence,

the participant experiences the virtual learning environment in his or her own way. The virtual learning environment refers to an imaginary space, manifested through a digital medium, including a collection of objects, rules and relationships governing those objects. The participant needs to immerse themselves in this virtual learning environment. Hence, the participant must be able to imagine the context of this virtual learning environment and communicate about the virtual learning environment. The last key element, interaction, refers to the requirement that the participant is able to interact with(in) this virtual learning environment (Sherman & Craig, 2018). The use of virtual reality allows the teacher to lecture the students live in a virtual space. The teacher can show the students the learning content on the spot and is able to scaffold the students learning during the virtual learning experience. This means the teacher must be engaged in the virtual learning environment (Greenwald et al., 2017, pp. 719-726). When implemented correctly, virtual reality has a positive effect on the knowledge and skills of students participating in a virtual reality learning experience. Furthermore, the outcomes are better than when a student learns in a traditional way or via digital learning tools like e-learning (Kyaw et al., 2019). These results indicate that virtual reality can contribute to positive learning outcomes of students as well.

As gamification, e-learning and virtual reality are considered useful tools to enhance students learning, the present study will use the study of Chou et al. (2018) to define and operationalize innovative teaching behaviour with ICT. They operationalised innovative teaching behaviour with ICT. Innovative teaching behaviour with ICT is defined as the intentional behaviour of teachers by making an effort to integrate ICT into their own innovative teaching material and their behaviour that influences students' innovative behaviour. In addition, the innovative teaching behaviours include deliberate actions aiming to stimulate ideas, and daily behaviour using ICT. After operationalizing the concept innovative teaching behaviour with ICT in a structural way, Chou et al. (2018) constructed a validated and reliable survey. In their study they studied on both micro and meso level factors influencing innovative teaching behaviour with ICT and found a significant correlation between the organizations' innovative climate and innovative teaching behaviour with ICT. On a micro level it was observed that the acceptance of technological innovation by the teacher partially mediated this relationship. The present study builds on the results of Chou et al. (2018) in order to expand the knowledge about the micro level factors associated with innovative teaching behaviour with ICT, like teachers' personality.

1.2.3. The five-factor model of personality (Big Five)

The micro level of innovative teaching behaviour with ICT will be studied by studying its relationship with teacher's personality. In order to study the relationship between the personality of the teacher and innovative teaching behaviour with ICT, an established and widely adopted personality model must be used. A model that is often used to identify personality traits is the five-factor model of personality; the Big-5 model (Ozer & Benet-Martinez, 2006). The Big-5 personality model is considered to be a

robust and stable personality model across instruments and observers (McCrae & Costa, 1987) and it can be concluded that the Big-5 personality model is the most agreed and less controversial personality framework to measure the five dimensions of personality of a participant (Abdullah, Omar, & Panatik, 2016). The Big-5 personality model is used to predict many aspects of life, including job performance (Neal, Yeo, Koy, & Xiao, 2012). For these reasons, the Big-5 personality model is also used in this study. The model consists of five independent personality traits. The first trait is extraversion, which indicates to which extent the individual engages with the external world and experiences positive emotions while engaging with the external world. The second dimension, agreeableness, indicates to which extent individuals value cooperation and social harmony, honesty, decency, and trustworthiness. The third dimension, conscientiousness, relates to the extent of the individuals values planning, possess the quality of persistence, and to which extent the individual is achievement-oriented. Next, the dimension neuroticism indicates to which extent the individual experiences negative emotions and if the individual is likely to emotionally overreact. Scores on the questionnaire for neuroticism can be inverted to obtain a score of 'emotional stability', which is the opposite construct of neuroticism. Finally, the last dimension, openness to experience, outlines to which extent the individual exhibits intellectual curiosity, self-awareness, and individualism/nonconformance (Ali, 2018; Digman, 1990; McCrae & Costa, 1987).

1.2.4. The Big-5 personality model and innovative teaching behaviour with ICT

Although the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT is not studied yet, the meta-analysis of Abdullah et al. (2016) found a relationship between the Big-5 personality traits and the stages of innovative behaviour. To be specific, the traits conscientiousness, openness to experience and extraversion are positively related to innovative behaviour and there is a positive relationship between agreeableness, extraversion and openness with the idea generation and idea promotion stages of innovative behaviour. Furthermore, in the study of Messmann, Mulder, and Gruber (2010), a positive relationship between openness to experience and innovative teaching behaviour was found. In addition to the findings of Abdullah et al. (2016), the results of Ali (2018) suggest that high levels of neuroticism discourage innovative behaviour of individuals. These findings indicate the likeliness that the Big-5 personality traits correlate with innovative teaching behaviour with ICT. Furthermore, Abdullah et al. (2016) found that the traits extraversion, agreeableness and conscientiousness are significantly positively related to technological innovation of the individual. This means the individual is more likely to innovate by using technology privately in order to benefit themselves, which could translate into teaching activities. The relationship between the aforementioned personality traits and the private use of ICT makes it plausible to imply that there is a relationship between the Big-5 personality traits and professional use of ICT: innovative teaching behaviour with ICT.

1.2.5. Work engagement

As mentioned, the present study studies the relationship between the Big-5 personality traits, innovative teaching behaviour with ICT and the partially mediating factor work engagement. Although there are several definitions for work engagement, in the present study the definition of Schaufeli, Salanova, González-Romá, and Bakker (2002) is used. They define work engagement as an active, positive work-related state that is characterized by vigour, dedication, and absorption. Work engagement involves three separate concepts: vigour, dedication, and absorption. Vigour can be explained as mental resilience while working and experiencing a high level of energy while working. Dedication can be explained as being involved in one's work while experiencing a sense of significance, challenge and enthusiasm. Lastly, absorption means that the individual is fully concentrated and working with intent (Schaufeli & Bakker, 2004b; Schaufeli et al., 2006). Although the present study studies work engagement in total, vigour, dedication, and absorption needed to be explained separately in order to understand the whole concept. The importance of studying work engagement is showed in the positive relationship between high work engagement and the employee showing high levels of creativity, task performance. Moreover, high work engagement correlates with innovative behaviour (Bakker, Demerouti, & Sanz-Vergel, 2014; Orth & Volmer, 2017; Wang et al., 2019).

1.2.6. The Big Five and work engagement

As stated before, there is a positive relationship between the Big-5 personality traits and work engagement. The Big-5 personality traits account for 48.10% of the variance in work engagement and the traits openness to experience, conscientiousness, extraversion and agreeableness are positively related to a high work engagement (Young et al., 2018). The traits conscientiousness and extraversion are most strongly related to high work engagement (De Zutter, Janssens, Geens, Vogt, & Braeckman, 2018; Hamid & Shah, 2017; Young et al., 2018). Although the trait openness to experience is less strongly related to work engagement, it is still significant related in the studies of Akhtar et al. (2015) and Hamid and Shah (2017). On the other hand, the trait neuroticism is, in most studies, negatively related to work engagement or there is no significant effect found at all (De Zutter et al., 2018; Hamid & Shah, 2017). This finding means that teachers with a high score on neuroticism score lower on work engagement. The opposite direction is studied by Inceoglu and Warr (2011). They found that emotional stability (reverse scored neuroticism) accounted for most of the variance in work engagement. This means also the reversed score of neuroticism is related to work engagement. In the present study, emotional stability will be used as an inverse measure of neuroticism.

1.2.7. Work engagement and innovative teaching behaviour

As previous findings indicate a positive association between the Big-5 personality traits and work engagement (De Zutter et al., 2018; Hamid & Shah, 2017; Young et al., 2018), and between work

engagement and innovative behaviour (Agarwal et al., 2012; Bhatnagar, 2012; Dulaimi, Ling, & Bajracharya, 2003; Konermann, 2012), it can be suggested that work engagement acts as a partial mediator of the association between the Big-5 personality traits and the use of innovative teaching behaviours (with ICT).

1.3 Research questions and hypothesis

1.3.1. Main question

As previous findings indicate there is a relationship between the Big 5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and innovative teaching behaviour, and between the before mentioned Big-5 personality traits and work engagement, the following research question is formulated including the factor 'use of digital learning tools (ICT)': 'what is the relationship between Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and innovative teaching behaviour with ICT and does work engagement partially mediate the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT?'

1.3.2. Sub-questions

1. What is the relationship between the Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and innovative teaching behaviour with ICT?
2. What is the relationship between the Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and work engagement?
3. What is the relationship between work engagement and innovative teaching behaviour with ICT?

1.3.3 Hypotheses

Abdullah et al. (2016) found in their literature review a positive relationship between the Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and some stages of innovative behaviour. The study of Messmann et al. (2010) found a positive relationship between openness to experience and innovative teaching behaviour and the study of Ali (2018) found a positive relationship between emotional stability and innovative behaviour. None of these studies included the innovative use of digital learning tools (ICT) by the teacher. Hence, in the present study, the following hypothesis is formulated:

H1[a-e]: openness to experience (a), conscientiousness (b), extraversion (c), agreeableness (d), and emotional stability (e) are significantly positively associated with innovative teaching behaviour with ICT.

The study of Young et al. (2018) found a positive relationship between the Big-5 personality traits openness to experience, conscientiousness, extraversion, and agreeableness and high work engagement. The study of De Zutter et al. (2018) found a negative relationship between neuroticism and work engagement. Neuroticism can be reverse scored as emotional stability. Emotional stability is positively related to work engagement (Inceoglu & Warr, 2011). In line with this, the following hypothesis is formulated:

H2[a-e]: Openness to experience (a), conscientiousness (b), extraversion (c), agreeableness (d), and emotional stability (e) are significantly positively associated with work engagement.

The study of Wang et al. (2019) reported a positive association between work engagement and innovative behaviour. Wang et al. (2019) did not include the factor ICT. Hence, the following hypothesis is formulated to reflect this:

H3: work engagement positively relates to innovative teaching behaviour with ICT.

Lastly, to study the partially mediating effect of work engagement in the relationship between the Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and innovative teaching behaviour with ICT the following hypothesis is formulated:

H4: Work engagement partially mediates the association between the Big-5 personality traits and innovative teaching behaviour with ICT.

The hypotheses are shown in Figure 1. Note that the Big-5 personality trait of neuroticism is inverted and is referred to as ‘emotional stability’.

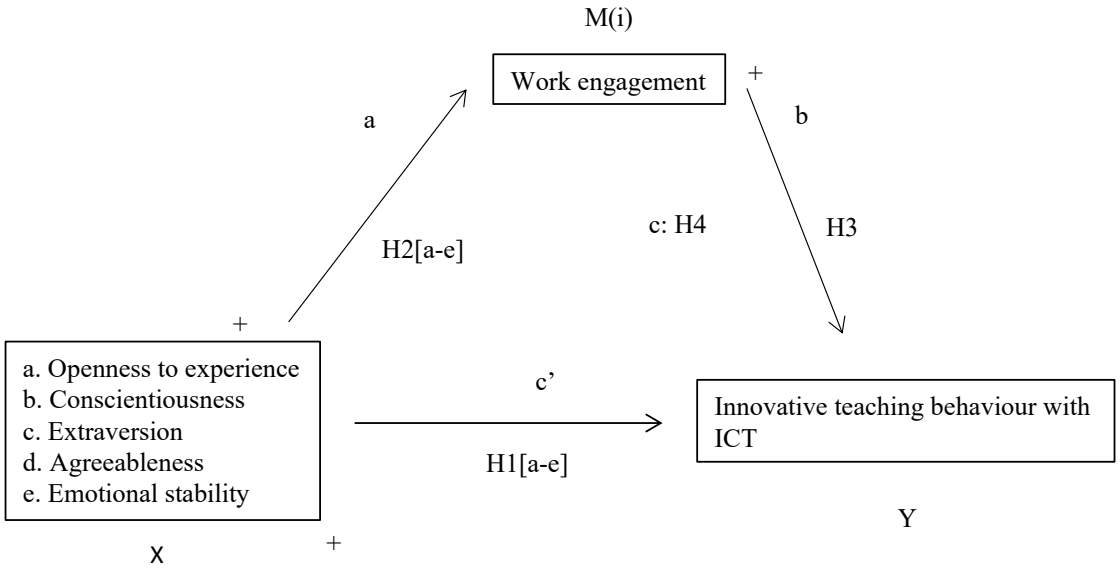


Figure 1. Conceptual model

2. Method

2.1 Participants

In the present study, 210 participants were recruited by random selection from a population of teachers teaching in vocational education working in a school for vocational education in an average sized city in the Netherlands. The school consists of seven departments from which only teachers out of the six not ICT-related departments were selected. Per department, 35 teachers were selected using a stratified a-select sample. In total 148 participants filled in the questionnaire. After removing the missing data and outliers 145 participants were included, 70 males (48%) and 75 females (52%). The total response percentage was 70%. Only participants with a minimum age of eighteen and a teaching degree and teaching job were included in the analysis. Teachers teaching in the department 'Design, Media & ICT' were excluded from selection because they naturally use ICT in their teaching. Lastly, participants that had not provided the informed consent were excluded.

2.2 Materials

An online survey was designed in Limesurvey. At first, the participants were asked relevant personal variables and teaching experience (attachment 4). Additionally, the teacher's department was asked as a control variable. The teacher chose only one of six departments: (1) Sport, Education & Society, which includes programmes such as social work and pedagogy, (2) Hospitality, Travel & Services, which includes programmes such as aviation services and hotel & facility management, (3) Personal Well-being & Healthcare, which includes programmes such as dental assistant and nursing studies, (4) Economy & Business, which includes programmes such as legal professions and office and management support, (5) Technology & Built Environment, which includes programmes such as process engineering and, (6) Mobility & Logistics, which includes programmes such as construction of motor vehicles, vehicles bodywork & two-wheeler technology. Teachers teaching in the department 'Design, Media & ICT', which includes programmes such as game & audio-video production and ICT, were excluded because teaching with digital means is unavoidable in this department.

To measure the Big-5 personality traits, the German version of the Big Five Inventory-25 (BFI-25) was translated into Dutch via the back-translation method and was then used for the study (attachment 5). The questionnaire consists of five subscales that measure the five personality traits. The subscale openness to experience consist of 5 items, conscientiousness of 5 items, extraversion of 4 items, of which 3 reverse scored items, agreeableness out of 6 items, of which 3 reverse scored items, and the subscale neuroticism consists of 5 items. In addition, scores for neuroticism could be inverted to obtain a score for emotional stability, which is the opposite of neuroticism. All items were scored on a seven-point Likert scale ranging from 0 (never true) to 7 (always true). An example of an item in

the questionnaire is: ‘I see myself as someone who tends to be disorganized’ or ‘I see myself as someone who starts quarrels with others’. The total score of every subscale was measured to measure the participants personality per trait (Gerlitz & Schupp, 2005). The lowest α-value of the subscales used in the present study have been computed at α=>.73.

To measure the teachers innovative teaching behaviour with ICT, a self-assessment scale of the teachers innovative teaching with ICT achievement, designed and validated by Chou et al. (2018), was used (attachment 6). The scale consists of ten items and measures two constructs, namely: innovative teaching achievement and creative teaching materials and methods. The construct innovative teaching achievement consists of six items and measures to which extent the teacher has been able to achieve certain goals regarding the use of ICT in their innovative teaching. Next, the construct creative teaching materials and methods consists of four items and measures to which extent the teacher has been able to achieve certain goals regarding adequately using materials for their innovative teaching with ICT. All items were scored on a five-point frequency rating scale ranging from 0 (never) to 5 (always). An example of a statement in the questionnaire is: ‘I can collect ICT supplementary teaching materials in order to enhance teaching efficacy’. The total score of the scale was used for data-analysis (Chou et al., 2018). The lowest α-value of the subscales used in the present study have been computed at α=.89

To measure work engagement, the Dutch version of the shortened UBES-9 was used, described by Schaufeli et al. (2006). The UBES-9 consists of three subscales that reflect the underlying dimensions of work engagement (attachment 7). Vigour (VI) consist of six items, dedication (DE) has five items and absorption (AB) has six items. All items were scored on a seven-point frequency rating scale ranging from 0 (never) to 6 (always). An example of a statement in the questionnaire is: ‘to me, my job is challenging’. The total score of the UBES-9 was used for data-analysis (Schaufeli & Bakker, 2004a). The α-values have been computed at α=>.91.

2.3 Procedure

The procedure was submitted to the Research Ethics Committee (cETO) to obtain permission to conduct the study. This permission was granted (attachment 1). The participants were approached via their work e-mail containing a link for opening the questionnaire and a request to participate and fill in the questionnaire via Limesurvey. In the e-mail, information about the study and the participants’ privacy was enclosed (attachment 2). The participant filled in the questionnaire at a moment of choice. After one week all participants received a reminder to fill in the questionnaire. After opening the questionnaire, the participant agreed to the informed consent before the study commenced by clicking the button ‘Yes’. In the consent information it was indicated that the data would be processed anonymously, and that the participant could stop participating at any time and the data could be deleted on request (attachment 3). Filling in the questionnaire took the participant approximately ten

minutes. After completing the questionnaire, the participant was thanked for participating. The participants did not receive a reward for filling in the questionnaire.

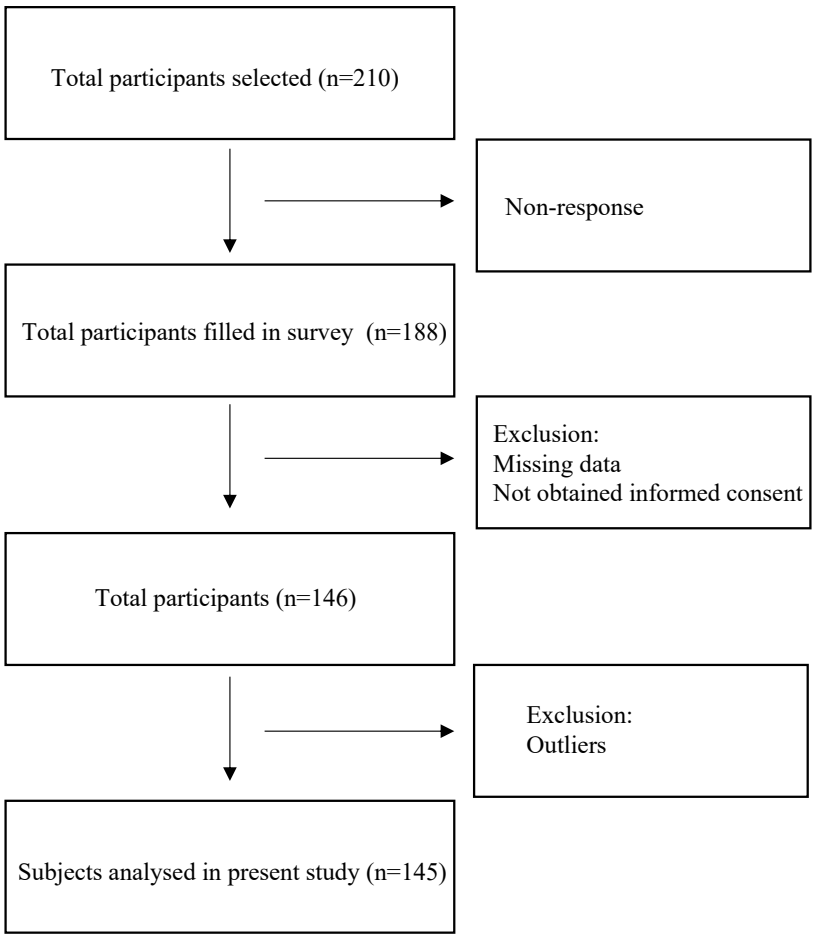
2.4 Data analysis

The research design of the present study was quantitative, non-experimental and cross-sectional correlational as it studied the relationship between every Big-5 personality trait and innovative teaching behaviour with ICT, and the mediating effect of work engagement. Before conducting the main analyses, outliers were excluded using Mahalanobis distance and the assumptions for data analysis were tested: multivariate normality using a histogram of the residuals of the combined predictors. Linearity and heteroscedasticity were tested using P-P plots of the expected versus the observed values of the residuals (attachment 8). Multicollinearity was tested using the correlation matrix (all R-values less than 0.9) and by checking VIF and tolerance values (attachment 9). Mediation was tested in various steps, using the method first described by Baron and Kenny (1986). By using linear regression models, it could be separately established if there are significant associations between the Big-5 personality traits and innovative teaching behaviour with ICT (hypotheses 1a to 1e), the Big-5 personality traits and work engagement (hypotheses 2a to 2e), and work engagement and innovative teaching behaviour with ICT (hypothesis 3). Next, for the significant predictors (Big-5 personality traits), a multivariate linear regression model was performed (hypothesis 4). The mediator (work engagement) was added to a model that included the significant Big-5 personality traits and innovative behaviour using ICT. Next, R^2 was interpreted to have a measure of the effect of adding the mediator to the model. All statistics have been computed using IBM SPSS.

3. Results

3.1 Sample characteristics

In total 146 participants completed the survey and were selected for analysis. The multivariate outliers were checked using Mahalanobis distance. It was concluded that there was one outlier, which was removed from the analysis. A total sample of 145 participants was analysed. A flowchart showing the flow of participants from recruitment to analysis is presented in Figure 2.



Note. *n* = number of participants.

Figure 2. Flowchart showing pathway from recruitment to analysis.

Table 1.

Characteristics of the final sample.

	Freq.	%
Gender		
Male	70	48.3
Female	75	51.7
Age		
20-30 years old	22	15.2
31-40 years old	37	25.5
41-50 years old	45	31.0
51-60 years old	30	20.7
61-70 years old	11	7.6
Duration of employment		
<2 years	19	13.1
2-5 years	42	29.0
6-10 years	24	16.6
11-15 years	29	20.0
>16 years	31	21.4
Main department teaching activities		
Sport, Education & Society	30	20.7
Hospitality, Travel & Services	27	18.6
Personal Well-being & Healthcare	32	22.1
Economy & Business	16	11.0
Technology & Built Environment	20	13.8
Mobility & Logistics	20	13.8
Highest degree obtained		
PhD	3	2.1
University bachelor or master	10	6.9
Tertiary vocational education	21	14.5
Higher vocational education	111	76.6
Working time factor		
<0.4fte	8	5.5
0.4-0.8fte	61	42.1
0.8-1.0fte	76	52.4
Teaching permit		
First- or second-degree teaching permit	84	57.9
Pedagogical Didactic Certificate	46	31.7
Other	15	10.3

Note. $n = 145$
Freq. = number of participants; % = percentage.

As can be seen in Table 1, the sample was heterogeneous. As expected, participants mainly completed vocational teaching-related studies and the participants were mostly employed part time or full time. Participants noted at 'other' they are still completing a study for the Pedagogical Didactic Certificate or a first- or second-degree teaching permit. A few participants have a primary school teaching permit from before 1986, which allows the participant to work in vocational education.

3.2 Questionnaire statistics

A reliability analysis was conducted on each of the questionnaires included in the survey using Cronbach's alpha. According to Nunnally (1978) a questionnaire is considered to be sufficiently reliable if $\alpha > .70$. In the present study, the BFI-25 was found to be sufficiently reliable, $\alpha=.73$. The

ITB was found to be highly reliable, α=.89. Lastly, the UBES-9 was also found to be highly reliable, α=.91. The descriptive statistics of the questionnaires can be found in Table 2.

Before conducting the main hierarchical multivariate regression analyses, it was checked if all the assumptions for conducting these analyses were met. At first, multivariate normality was checked using a histogram of the residuals of the combined predictors. It was concluded that the data were normally distributed. Next, multivariate linearity and homoscedasticity were checked using a P-P plot and scatterplot of the expected versus the observed values of the residuals. It was concluded that the data were linear and homoscedastic. Multicollinearity was checked by investigating the correlation matrix of all predictors. None of the predictors correlated higher than r=.8. In addition, all tolerance values were <1. So, there was no multicollinearity present in the data.

Table 2.

Descriptive statistics of the questionnaires used in the study.

	M(*SD*)	Min	Max
BFI-25			
Openness to experience	5.14(0.93)	2.60	7.00
Extraversion	5.10(1.01)	2.60	7.00
Agreeableness	5.83(0.81)	3.80	7.00
Conscientiousness	5.07(0.59)	3.40	6.20
Emotional Stability	4.76(1.02)	1.60	6.80
ITB	3.40(0.57)	1.88	4.67
UBES-9	5.61(0.77)	3.11	7.00

M = Mean; *SD* = Standard deviation.

Main analyses

To study the hypotheses of the present study hierarchical regression analyses were conducted, which are presented in Tables 3 and 4.

Table 3

Hierarchical multiple regression analysis with innovative teaching behaviour with ICT as a dependent variable

	Model 1			Model 2		
	B	*SE*	β	*B*	*SE*	β
Openness to experience	.15	.05	.24**	.14	.05	.22**
Conscientiousness	.04	.08	.04	.03	.08	.03
Extraversion	-.03	.05	-.06	-.04	.05	-.07
Agreeableness	-.04	.06	-.06	-.05	.06	-.08
Emotional stability	.07	.05	.13	.06	.05	.10
Work engagement				.12	.06	.16
R^2		0.76			.10	
ΔR^2		.043			.06	
F		2.20			2.54	

Note. n = 145
* = *p*< .05
** = *p* < .01
*** = *p* < .001

Table 4

Multiple regression analysis with work engagement as a dependent variable

	Model 1		
	B	*SE*	β
Openness to experience	.06	.07	.08
Conscientiousness	.08	.11	.06
Extraversion	.02	.06	.03
Agreeableness	.11	.08	.12
Emotional stability	.13	.06	.17*
R^2		0.07	
ΔR^2		0.04	
F		2.03	

Note. n = 145
* = *p*< .05
** = *p* < .01
*** = *p* < .001

The hypotheses 1[a-e] suggested that openness to experience (a), conscientiousness (b), extraversion (c), agreeableness (d), and emotional stability (e) are significantly positively associated with innovative teaching behaviour with ICT. The results from model 1 in Table 3 show that only

hypothesis 1a is supported: there was a significant positive association between openness to experience and innovative teaching behaviour with ICT; β=.24, *p*=.01. Hypotheses 2[a-e] suggested that openness to experience (a), conscientiousness (b), extraversion (c), agreeableness (d), and emotional stability (e) are significantly positively associated with work engagement. The results from model 1 in Table 4 show that only hypothesis 2e is supported: there was a significant positive association between emotional stability and work engagement; β=.17, *p*=.048. Hypothesis 3 suggested that work engagement positively relates to innovative teaching behaviour with ICT. The results from model 2 in Table 3 show that this hypothesis is not supported: there was no association between work engagement and innovative teaching behaviour with ICT. Lastly, hypothesis 4 suggested that work engagement partially mediates the association between the Big-5 personality traits and innovative teaching behaviour with ICT. The results from model 2 in Table 3 show that work engagement was not related to innovative teaching behaviour with ICT. Therefore, work engagement also did not mediate any associations between the Big-5 personality traits and innovative behaviour with ICT. This means hypothesis 4 was not supported.

4. Conclusion and discussion

4.1 Conclusion and discussion

The present study studied the relationship between innovative teaching behaviour with ICT, the five-factor model of personality (Big-5) and the partial mediating factor of work engagement. Previous studies indicated the relationship between the Big 5 personality traits and innovative (teaching) behaviour (Abdullah et al., 2016; Messmann et al., 2010), between the Big 5 personality traits and work engagement (De Zutter et al., 2018; Hamid & Shah, 2017), and between innovative (teaching) behaviour and work engagement (Agarwal, 2014; Bhatnagar, 2012). The goal of the present study was to expand the current knowledge about innovative teaching behaviour with ICT operationalised by Chou et al. (2018), as the use of digital learning tools by educators is increasing rapidly. This extension of knowledge is studied by examining the relationship between the five-factor model of personality (Big-5), innovative teaching behaviour with ICT, and the partial mediating factor of work engagement. This goal resulted in the following research question: ‘what is the relationship between Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and innovative teaching behaviour with ICT and does work engagement partially mediate the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT?'. It was hypothesized that openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability are significantly positively associated with both innovative teaching behaviour with ICT and work engagement. Also, it was expected that work engagement positively relates to innovative teaching behaviour with ICT and that work engagement partially

mediates the association between the Big-5 personality traits and innovative teaching behaviour with ICT. To study the hypotheses a hierarchical multivariate linear regression analysis was performed.

From the results of hypotheses 1[a-e] it can be concluded that only openness to experience is positively related to innovative teaching behaviour with ICT. These findings indicate that teachers more open to experiences are more likely to apply innovative teaching behaviour with ICT. It is interesting to note that in the present study the Big-5 personality traits agreeableness, conscientiousness and extraversion are not associated with innovative teaching behaviour with ICT, as the mentioned personality traits are associated with innovative (teaching) behaviour in the study of Ali (2018) and Messmann et al. (2010). An explanation for these findings can be found in the inclusion of ICT in the present study. Chou et al. (2018) conceptualised innovative teaching behaviour with ICT as a totally different concept. In their concept they measure the teacher's achievement on idea generation, setting learning goals, and creating learning applications in order to include the use of ICT in all aspects of a curriculum. This means that the concept of Chou et al. (2018) measures the teachers self-report on innovative teaching achievements rather than teachers intended innovative behaviour. This is the opposite of the study of Ali (2018) in which intended behaviour is measured. So, the difference in measuring could be an explanation for the significant relationship between openness to experience and innovative teaching behaviour with ICT and the non-significant relationship between agreeableness, conscientiousness, extraversion, and emotional stability and innovative teaching behaviour with ICT. The teacher must also apply innovative teaching behaviour with ICT in order to score positively on the innovative teaching behaviour with ICT questionnaire. In order to use digital learning tools, it is inevitable the teacher has to be open to experiences.

Another explanation can be found if we place the present study in the context of the study of Judge, Rodell, Klinger, Simon, and Crawford (2013), combined with the case that the use of innovative learning tools by teachers being relatively new and not part of the teachers tasks and role. They studied achievement and job performance and developed and tested a hierarchical representation of personality, from NEO sub facets, described by Costa Jr., and McCrae (1992) and Costa and McCrae (1998) to DeYoung, Quilty, and Peterson (2007) facets. Interestingly, openness was related to DeYoung et al. (2007) facets in intellect and aesthetic openness to NEO Sub-Facets ideas, actions, aesthetics, fantasy, feeling, values. These findings indicate there is a correlation between openness of teachers and their intellect, and the teacher's aesthetic openness and teachers creating ideas and taking actions. Therefore, it may be assumed that the teacher needs the trait openness to be able to show intellect, create ideas and take actions in order to apply innovative teaching behaviour with ICT. The other Big-5 personality traits in the study of Judge et al. (2013) are less action based, and therefore do not include innovative thinking, creating ideas or using intellect.

From the results of hypotheses 2[a-e] it can be concluded that of all Big-5 personality traits, only emotional stability is positively related to work engagement. These findings indicate that emotionally stable teachers are more engaged in their work. This finding is in line with the study of

Ali (2018), in which the positive association between emotional stability and innovative behaviour is confirmed. The same relationship was found with the reverse scored trait emotional stability, neuroticism, in the study of De Zutter et al. (2018). They found that high levels of neuroticism are related to low levels of Vigour and Dedication. Although in the present study only an association between the trait emotional stability and work engagement is found. The findings should be interpreted carefully since the review of Mäkikangas, Feldt, Kinnunen, and Mauno (2013) found that apart from emotional stability, the traits extraversion, and conscientiousness predict a unique variance in work engagement as well. An important note in their review is that it is mostly unknown which mechanisms are responsible for the relationship between personality and work engagement. Additionally, note that work engagement fluctuates within persons and through time and situations (Bakker et al., 2014; Sonnentag, Dormann, & Demerouti, 2010, pp. 25-38). These notes highlight the importance to further study the directions of the associations between emotional stability and work engagement since an underlying factor in work engagement is that the employee's performance is a product of emotional stability. Performance is defined as is the ability of an employee to accomplish work related goals and expectations in accordance with certain predetermined work standards like taking personal initiatives, taking charge and having a proactive attitude (Oriarewo, Ofobruku, Agbaeze, & Tor, 2018).

Surprisingly, the results of hypothesis 3 show there is no association between work engagement and innovative teaching behaviour with ICT. This finding indicates that teachers work engagement does not affect innovative teaching behaviour with ICT. A less engaged teacher could apply the same amount of innovative teaching behaviour with ICT as a teacher who is highly engaged. This finding is in contrast with the study of Wang et al. (2019) in which work engagement is linked to nurses showing high levels of creativity and innovative behaviour. The finding can be explained by the study of Christian, Garza, and Slaughter (2011). They found that due to their strong dedication and focus on their work activities, engaged workers demonstrate well in a work role task performance. These work role task performances are defined as opportunities for employees to apply themselves energetically, expressively, and behaviourally in an inclusive and concurrent way (Kahn, 1992; Rich, Lepine, & Crawford, 2010). As such, work engagement is a motivational concept that assigns the allocation of personal resources to work-related tasks corresponding to the work role (Kanfer, 1990; Rich et al., 2010). It can be argued in contradiction to the nurses in the study of Wang et al. (2019), in the present study the participating teachers possibly did not associate innovative teaching behaviour with ICT with their tasks, and work role since the use of innovative digital learning tools is relatively new in education and not yet required.

Lastly, the results of hypothesis 4 show that work engagement is not related to innovative teaching behaviour with ICT. Therefore, work engagement does not mediate any associations between the Big-5 personality traits openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability and innovative teaching behaviour with ICT. This finding supposes that work

engagement does not influence the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT. As mentioned before, the innovative teaching behaviour with ICT questionnaire is measuring achievement instead of intended behaviour. Measuring achievement in a task instead of intended behaviour in a work role performance task may have caused the difference in results between previous studies and this present study. This finding indicates that work engagement possibly was not the right variable to measure partial mediation. An interesting and popular bottom-up approach that is more suitable and might mediate the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT is job crafting described by Wrzesniewski and Dutton (2001). Job crafting means that the employee makes changes in their task or relational boundaries at work. This includes cognitive changes, like in how an employee sees the job, and physical changes, like the employees' scope, their relationships in the workplace and the amount of jobs tasks (Van Wingerden, Derks, & Bakker, 2017). It is interesting to note that interventions show that employees can learn job crafting, which improves the employees job resources and personal resources and results in a higher work engagement and better performance at work (Gordon et al., 2018). Job crafting possibly mediates the relationship between the Big-5 personality traits and innovative teaching behaviour with ICT as the teacher must perform tasks and use resources, like digital learning tools, that are not included in the current job description. The resources are still in development and the teacher needs to change in the before-mentioned cognitive and physical way to adopt the use of digital learning tools. Future research can study the mechanisms involved in changing the teachers job crafting, enhancing the teachers' use of digital learning tools in their teaching.

4.2 Strengths and limitations

The present study contains strengths and limitations. The first strength is a high statistical power due to the size and heterogeneousness of the sample. A high statistical power is a measure that indicates the likeliness of the test producing a statistically significant result. Furthermore, in a study with a high statistical power the likeliness of finding a true difference or a statistically significant result is higher, which also affects the reliability of the test positively (Altman, 1980). The second strength is the use of validated questionnaires with a high internal reliability. According to Creswell (2002) a high internal reliability results in a stable individual score on the instrument that is the same on repeated measurements. Therefore, it may be assumed that the instrument measures consistent and does not contain measurement errors. The high internal reliability of the present study makes it possible to compare scores of individuals with scores of individuals at the same questionnaire in other studies. Additionally, it is evident that a high validity indicates that the intended test interpretation is in line with the test purpose. This evidence is based on test content, responses process, internal structure, relations to other variables, and the consequences of testing (Creswell, 2002). The high validity in the present study indicates the measured constructs in the questionnaire were measured well enough to interpret the scores and make statements about the scores.

The first limitation is that the BFI-25 and the innovative teaching behaviour with ICT questionnaires were translated into the Dutch language. The preferable translation method consists of several steps (1) establish expert committee, (2) forward translation, (3) backward translation and (4) preliminary pilot testing (Tsang, Royse, & Terkawi, 2017). In the present study the first three steps were completed, but the questionnaires were not preliminary tested due to time constraints. By skipping the preliminary pilot testing, no separate statements can be made about the reliability; internal consistency, test-retest reliability, inter-rater reliability and about the validity; content validity, construct validity and other validations (Tsang et al., 2017). In the present study only statements can be made about the internal consistency, as it was calculated only after administration and found to be sufficiently reliable. Secondly, the reader should bear in mind that the study is based on digital self-assessment questionnaires that were completed voluntarily. According to Donaldson and Grant-Vallone (2002) participants tend to under-report behaviours deemed inappropriate by researchers or other observers, and participants tend to over-report behaviours viewed as appropriate. The tendency to under- and over- report may result in that teachers who are more likely to use digital learning tools, possibly are more likely to fill in a digital questionnaire about the use of ICT in their teaching. Teachers who do not want to use technology possibly avoid completing a digital questionnaire about the use of ICT in the classroom. It is also possible that teachers who are more likely to innovate in teaching are also more likely to complete a questionnaire about innovative behaviour with ICT. In contrast to those teachers who do not easily innovate their teaching. Lastly, the participants involved teach different subjects in different departments in vocational education. This means there is a wide variety in the way ICT is utilised due to the different courses and different departments. It is likely teachers teach subjects less suitable for digital learning tools, like practical lessons in painting or practical lessons in woodworks. The teacher that would have been more likely to apply innovative teaching behaviour through ICT is missed in the present study due to the teacher is not able to teach with ICT since it serves no purpose for their subject(s).

4.3 Practical recommendations

Apart from the limitations, it is believed, that the present study provides useful information regarding what managers in education should focus on while implementing digital learning tools used by teachers in order to enhance students learning. For managers it would be useful to assess the teacher's personality in order to know which teacher is open to experiences and emotionally stable and which teacher is not. The manager can provide the teacher that is open to experiences and emotionally stable with (the often limited) digital learning tools, like robots, expensive e-learnings, virtual reality devices, etc. since the teacher is likely to successfully utilise/implement these tools. In contrast, the manager should stimulate, inspire and facilitate the teacher that is not open to experiences and/or emotionally stable to find new ways in implementing ICT in their teaching. The present study also provides useful target points for management since the trait's contentiousness, agreeableness, extraversion and the

work engagement of the teacher are not associated with innovative teaching behaviour with ICT. As most personality traits are not associated with innovative behaviour with ICT, the manager should focus less on the micro level and more on the meso level, for example on the innovative climate, and indirectly the acceptance of technological innovation, as stated in Thurlings et al. (2015).

4.4 Recommendations for future research

In addition to the practical recommendations the results of the present study offer starting points for future research. Firstly, the department Design, Media & ICT should be included. In the present study the department Design, Media & ICT was excluded since it was expected that the use of ICT in the department was inevitable. Future studies can include the department Design, Media & ICT in order to gain insight in the innovative tools that teachers in the department Design, Media & ICT use. It is expected there is a difference in the use of ICT, thus a comparison in the use of innovative teaching tools can be made between teachers teaching in the department Design, Media & ICT and the other departments within the institution. The goal is to expand knowledge across the possible differences in the use of digital learning tools and to expand the knowledge about factors enhancing innovative teaching behaviour with ICT. Lastly, a top-down approach could be employed instead of a bottom-up approach. In the present study a bottom-up approach was used since the participants were asked about their experiences with innovative teaching with ICT. A top-down approach can gain other insights than the bottom-up approach used in the present study (Sabatier, 1986). Future research should employ a top-down approach as the concept innovative teaching behaviour with ICT is less studied than the concept innovative teaching behaviour and the use of digital learning tools (ICT) is also relatively new to education. Future studies can focus on the perception of the teacher about the relatively new concept innovative teaching with ICT. It could be that teacher ‘x’ considers using a smartphone is ‘innovative’, while teacher ‘y’ has the idea that only using augmented reality is innovative. For that reason, future studies can design a questionnaire which includes prelisted digital learning tools. Additionally, the teacher can be asked about their knowledge, values and attitudes towards the selected prelisted digital learning tools.

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5. Attachments

Attachment 1: permission cETO to conduct research

commissie Ethische Toetsing Onderzoek (cETO)

Aan: Prof. dr. Rob Martens
Open Universiteit

E Halszka.Jarodzka@ou.nl
T 045-5762410

23 april 2019
Beoordeling 'The relationship between the big-5 personality traits and innovative teaching behavior with ICT and the partial mediating effect of work engagement'
Ethische toetsing

ons kenmerk: U2019/03202/MQF

Geachte prof. dr. R. Martens

Op 4 april heeft de commissie Ethische Toetsing Onderzoek (cETO) het verzoek in behandeling genomen om het onderzoeksvoorstel 'The relationship between the big-5 personality traits and innovative teaching behavior with ICT and the partial mediating effect of work engagemen' ethisch te toetsen.

Het in de aanvraag beschreven onderzoek heeft als doel: to studies the relationship between innovative teaching behavior with ICT and the big-5 personality traits

De cETO heeft – gezien de goedkeuring van het onderzoeksvoorstel door de begeleider – de aanvraag alleen getoetst op de aspecten van de Algemene verordening gegevensbescherming (AVG), daarmee samenhangende zaken en de manier waarop proefpersonen in het onderzoek worden betrokken (o.a. informed consent, informatiebrieven).

De cETO heeft op 23 april nog enkele vragen per mail aan de onderzoeker voorgelegd, die diezelfde dag beantwoord zijn. De cETO heeft nog enkele opmerkingen:

- Het gebruik van een emailadres van Deltion is niet toegestaan dus graag te allen tijde een OU mailadres gebruiken
- De cETO wil erop attenderen dat emailadressen als persoonsgegevens beschouwd moeten worden en dat deze dus op gepaste wijze bewaard moeten worden op de T-drive.
- Graag in de informatiebrief volledig benoemen welke persoonsgegevens worden verzameld voor het onderzoek. Ook staat onder kopje 7 dat er bijzondere persoonsgegevens verzameld worden. Dit zijn echter geen bijzondere persoonsgegevens, dus graag aanpassen.
- De CETO wil erop attenderen dat LimeSurvey en MWM2 toegestaan zijn voor gebruik van online vragenlijsten. Mits er andere tools wenselijk zijn, dient het gebruik hiervan voorgelegd te worden.

bezoekadres: Valkenburgerweg 177 Heerlen
postadres: Postbus 2960 6401 DL Heerlen
T 045 - 576 22 22

Open Universiteit
www.ou.nl

- Aangezien de verantwoordelijkheid van het onderzoek valt onder de OU, zijn alleen de contactgegevens van de FG van de OU nodig voor vermelding.

Op basis van het goedgekeurde onderzoeksvoorstel, de additionele beantwoording op 23 april en dit besluit geeft de cETO een positief advies **op de ethische toetsing.**

U dient de data die u verzamelt gedurende uw onderzoek op een veilige wijze op te slaan, conform de huidige wet- en regelgeving. Dat betekent dat uw data opgeslagen moet worden op de T-schijf, zodat deze niet toegankelijk is voor anderen, voorzien is van goede beveiliging en verlies van data voorkomen kan worden. Iedere medewerker kan toegang krijgen tot de T-drive via een verzoek aan de servicedesk, onder vermelding van diens acroniem[link: servicedesk@ou.nl].
Als samenwerkingsomgeving met collega's kunt u gebruik maken van SURFdrive. Het is niet veilig om een openbare link aan te maken in Surfdrive.
Indien u bestanden wilt versturen of ontvangen kunt u gebruik maken van SURFfilesender. Zo is het bijvoorbeeld mogelijk dat een onderzoeker een map aan maakt en de studenten hierin met behulp van encyption een bestand plaatsen.
SURFdrive en SURFfilesender mogen uitsluitend gebruikt worden als omgeving om data met elkaar te delen, de onderzoeker dient met enige regelmaat de data op te slaan op diens persoonlijke map op de T-drive.

We wensen u veel succes met de uitvoering van het onderzoek

Met vriendelijke groet,

Dr. H.M. Jarodzka
voorzitter cETO

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Attachment 2: information letter participants

Geachte heer/mevrouw,
Wij vragen u om mee te doen aan een wetenschappelijk onderzoek. Meedoen is vrijwillig. Om u mee te laten doen, hebben wij wel uw schriftelijke toestemming nodig. U bent geselecteerd voor deelname aangezien u werkzaam bent als leraar bij Deltion College.
Voordat u beslist of u wilt meedoen aan dit onderzoek, krijgt u uitleg over wat het onderzoek inhoudt. Lees deze informatie rustig door en vraag de onderzoeker, Raymond Rutgers, uitleg als u vragen heeft. U kunt ook de hoofdonderzoeker, die aan het eind van deze brief genoemd wordt, om aanvullende informatie vragen.

1. Doel van het onderzoek
Het doel van het onderzoek is om de bestaande kennis over het gebruik van ICT in onderwijsactiviteiten uit te breiden, waardoor we meer te weten komen over hoe het gebruik van digitale leermiddelen (ICT) zo goed mogelijk in onderwijsactiviteiten kan worden geïmplementeerd.

2. Achtergrond van het onderzoek
Het gebruik van Informatie Communicatie Technologie (ICT) heeft zijn intrede gedaan en is niet meer weg te denken in de huidige maatschappij. Er komen in hoog tempo meer technologische mogelijkheden en verschillende beroepssectoren gaan deze ICT-mogelijkheden inzetten. Ook de onderwijssector experimenteert steeds meer met het gebruik van ICT; denk aan blended learning, augmented reality, virtual reality, afstandsleren, etc. De maatschappelijke behoefte aan het gebruik van deze digitale leermiddelen komt zo snel op dat er aan de ene kant een grote behoefte is aan de implementatie van ICT in het onderwijs, maar aan de andere kant weinig bekend is over hoe het gebruik van ICT in het onderwijs het beste kan worden geïmplementeerd.

3. Wat meedoen inhoudt en wat wordt er van u verwacht
Deelname aan het onderzoek houdt in dat u een online vragenlijst invult. Als eerste wordt u gevraagd uw algemene persoonlijke gegevens in te vullen zoals uw geslacht, leeftijd, aantal jaren werkervaring, het college waar u lesgeeft, etc. Daarna volgen vragen waarin u antwoordt op stellingen over uw persoonlijkheid, in hoeverre u ICT gebruikt bij uw lesactiviteiten en over hoe enthousiast u bent over uw werk. U geeft door middel van een schaal aan in hoeverre u zich herkent in de stelling. Als u alle stellingen heeft beantwoord, sluit u de vragenlijst af.

4. Mogelijke voor- en nadelen

U hebt zelf geen direct voordeel van deelname aan het onderzoek. Wel kan uw deelname ervoor zorgen dat er meer kennis beschikbaar komt over het gebruik van ICT in onderwijsactiviteiten, waardoor ICT in onderwijsactiviteiten in de toekomst op de juiste wijze geïmplementeerd kan worden. Hier heeft u wellicht in de toekomst voordeel van.
Meedoen aan het onderzoek heeft geen nadelen voor u, behalve dat u tijd vrij moet maken om de vragenlijst in te vullen.

5. Als u niet wilt meedoen of wilt stoppen met het onderzoek

U beslist zelf of u meedoet aan het onderzoek. Deelname is vrijwillig. Als u niet wilt deelnemen heeft dat geen nadelige gevolgen voor u. Als u wel meedoet, kunt u zich altijd bedenken en toch stoppen, ook tijdens het onderzoek. U hoeft niet te zeggen waarom u stopt. De gegevens die tot dat moment zijn verzameld, mogen worden gebruikt voor het onderzoek.

6. Einde van het onderzoek

Uw deelname aan het onderzoek stopt als u de hele vragenlijst heeft ingevuld en verstuurd. Het hele onderzoek is afgelopen als alle deelnemers klaar zijn. Na het verwerken van alle gegevens informeert de onderzoeker u over de belangrijkste uitkomsten van het onderzoek. Dit gebeurt ongeveer drie maanden na uw deelname.

7. Gebruik en bewaren van uw gegevens

Voor dit onderzoek worden er persoonsgegevens verzameld, gebruikt en bewaard. Het gaat om in de in de Algemene Verordening Gegevensbescherming (AVG) genoemde gewone persoonsgegevens zoals uw geslacht, leeftijd, aantal jaren werkervaring, het college waar uw werkt, etc. Daarnaast worden bijzondere persoonsgegevens gevraagd over uw persoonlijkheid, over hoe enthousiast u bent over uw werk, over hoe u ICT gebruikt in uw werk en uw denkwijze over de integratie van ICT in uw werk. Het verzamelen, gebruiken en bewaren van uw gegevens is nodig om de vragen die in dit onderzoek worden gesteld te kunnen beantwoorden. De uitkomsten van het onderzoek zullen worden gedeeld met collega's. De gegevens die worden gedeeld bevatten geen informatie die tot u te herleiden is. Ook in rapporten en publicaties over het onderzoek zijn de gegevens niet tot u te herleiden.

Vertrouwelijkheid van uw gegevens

Om uw privacy te beschermen krijgen uw gegevens een code. Uw naam en andere gegevens die u direct kunnen identificeren worden daarbij weggelaten. Uw gegevens worden op deze wijze versleuteld. De sleutel van de code blijft veilig opgeborgen, binnen de Open Universiteit. Personen die toegang krijgen tot de niet-versleutelde informatie zijn Raymond Rutgers en prof. dr. Rob Martens.

Toegang tot uw gegevens voor controle

Om te kunnen beoordelen of het onderzoek op een betrouwbare wijze is uitgevoerd, kunnen leden van een visitatiecommissie inzage krijgen in de niet-versleutelde informatie.

Bewaartermijn gegevens

Uw gegevens moeten 10 jaar worden bewaard door de Open Universiteit.

Meer informatie over uw rechten bij verwerking van gegevens

Voor algemene informatie over uw rechten bij verwerking van uw persoonsgegevens kunt u de website van de Autoriteit Persoonsgegevens raadplegen. De privacy disclaimer van de Open Universiteit vindt u via www.ou.nl/privacy .

8. Vergoeding voor meedoen

Meedoen aan het onderzoek geschiedt op vrijwillige basis. U krijgt hiervoor geen vergoeding.

9. Heeft u vragen?

Bij vragen kunt u contact opnemen met prof. dr. Rob Martens, hoogleraar vakgroepvoorzitter doceren en docent professionalisering aan de faculteit psychologie en onderwijswetenschappen (Welten-instituut) van de Open Universiteit via: Rob.Martens@ou.nl

10.Ondertekening toestemmingsformulier

Wanneer u voldoende bedenktijd heeft gehad, wordt u gevraagd te beslissen over deelname aan dit onderzoek. Door uw schriftelijke toestemming geeft u aan dat u de informatie heeft begrepen en instemt met deelname aan het onderzoek. Toestemming verleent u door voor het invullen van de online vragenlijst aan te klikken dat u akkoord gaat met de toestemmingsverklaring.

Attachment 3: online informed consent

U staat op het punt om mee te doen aan een onderzoek over het gebruik van digitale leermiddelen (ICT) tijdens lesactiviteiten door leraren in het mbo-onderwijs. Het meedoen aan het onderzoek houdt in dat u een vragenlijst invult waarin u eerst uw persoonlijke gegevens invult, zoals uw geslacht, leeftijd, werkervaring, het college waar u lesgeeft, etc. Vervolgens beantwoordt u vragen over uw persoonlijkheid, over het gebruik van ICT tijdens lesactiviteiten en over hoe u uw werk beleeft.

Het onderzoek vindt plaats in het kader van een masterthesis van Raymond Rutgers voor de studie onderwijswetenschappen aan de Open Universiteit. Het onderzoek wordt uitgevoerd in opdracht van de afdeling onderwijs en kwaliteit van Deltion College.

Meedoen aan het onderzoek houdt in:

- Ik geef toestemming voor het gebruik van de gegevens die tijdens dit onderzoek worden verzameld voor dit wetenschappelijk onderzoek.
- Ik heb de informatiebrief met betrekking tot deze studie gelezen/ ontvangen en ik heb de gelegenheid gehad om vragen aan de onderzoeker te stellen als bepaalde punten niet duidelijk waren.
- Ik begrijp dat alle informatie die ik met betrekking tot deze studie verstrek, op een veilige manier zal worden verzameld, anoniem zal worden gepubliceerd en daarom niet naar mij terug zal leiden.
- Ik begrijp dat ik op elk moment uit het onderzoek kan stappen en ik hoef daar geen reden voor op te geven.
- De gegevens worden opgeslagen voor een periode van 10 jaar, in overeenstemming met de VSNU-richtlijnen

Als u de bovenstaande punten heeft gelezen en ermee instemt deel te nemen aan het onderzoek, tekent u dit toestemmingsformulier hieronder door de optie 'ja' te selecteren.

Attachment 4: introductory questions in survey

Wat is uw geslacht?	• Man • Vrouw
In welke leeftijdscategorie valt u?	• 20-30 jaar • 31-40 jaar • 41-50 jaar • 51-60 jaar • 61-70 jaar
Hoe lang bent u al werkzaam als leraar?	• Minder dan twee jaar • Twee tot en met vijf jaar • Zes tot en met tien jaar • Elf tot en met vijftien jaar • Zestien jaar of langer
Bij welk college geeft u het meeste les (hoofdaanstelling)?	• Sport, Opvoeding & Maatschappij • Horeca, Reizen & Dienstverlening • Welzijn & Gezondheid • Economie & Ondernemen • Design, Media & ICT • Techniek & Gebouwde omgeving • Mobiliteit & Logistiek. Start.Deltion
Wat is uw hoogst genoten opleiding?	• Hoger beroepsonderwijs (hbo) • Post hoger beroepsonderwijs (post hbo) • Wetenschappelijk onderwijs (wo) • Gepromoveerd
Wat is de omvang van uw dienstverband?	• tot 0.4 fte • 0.4-0.8 fte • 0.8-1.0 fte
Hoe heeft u uw lerarenbevoegdheid behaald?	• eerste- of tweedegraads lerarenopleiding • pedagogisch didactisch getuigschrift (pdg) • anders, namelijk…

Attachment 5: BFI-25 questionnaire

De BFI-25 is een meetinstrument om de het vijf factoren model van persoonlijkheid te meten.

Het volgende blok bevat 25 stellingen over persoonlijke eigenschappen. U wordt gevraagd in hoeverre u het eens of oneens bent met de stelling. De schaal bestaat uit zeven opties die variëren van helemaal mee oneens tot helemaal mee eens.

Stellingen: ik zie mijzelf als iemand die…

1. Gereserveerd, stil is.
2. De neiging heeft om stil te zijn.
3. Spraakzaam is.
4. Inventief is.
5. Neigt ongeorganiseerd te zijn.
6. Meestal lui is.
7. Extravert, sociaal is.
8. Soms verlegen, geremd is.
9. Houdt van nadenken, spelen met ideeën.
10. Een actieve verbeeldingskracht heeft.
11. Artistieke, esthetische ervaringen waardeert.
12. Origineel is, met nieuwe ideeën komt.
13. Grondig te werk gaat.
14. Dingen efficiënt doet.
15. Volhoudt tot de taak is volbracht.
16. Zich veel zorgen maakt.
17. Relaxed is, goed met stress om kan gaan.
18. Gespannen kan zijn.
19. Gemakkelijk nerveus raakt.
20. Emotioneel stabiel is, niet gemakkelijk van slag raakt.
21. Soms onbeleefd tegen anderen is.
22. Koud en afstandelijk kan zijn.
23. Ruzies begint met anderen.
24. Attent en vriendelijk is tegen bijna iedereen.
25. Vergevingsgezind van aard is.

Attachment 6: Innovative teaching behaviour with ICT questionnaire

De vragenlijst ‘innovative teaching behaviour with ICT’ is een meetinstrument om ICT-lesprestaties en het gebruik van ICT in onderwijsmaterialen te meten.

Het volgende blok bevat tien vragen over het gebruik van digitale leermaterialen. Digitale leermaterialen zijn digitale materialen die doelgericht in worden gezet om het leerrendement van de student te bevorderen.
Denk hierbij aan digitale leermaterialen die u gebruikt als (hulp)middel om de lesstof over te brengen, bijvoorbeeld blended learning en e-learning. Ook kan een digitaal leermiddel gebruikt worden als informatiebron, denk bijvoorbeeld aan een digitaal portfolio of een digitale omgeving waarin de student de lesstof deelt met u en/of anderen. Daarnaast kan een digitaal leermiddel gebruikt worden om te leren in de praktijk, bijvoorbeeld simulaties d.m.v. video’s, games, augmented reality. Als laatste kan een digitaal leermiddel gebruikt worden om te communiceren over de lesstof, bijvoorbeeld door online discussiefora, online klas.

1. Ik weet welke verschillende digitale leermaterialen ingezet kunnen worden.
2. Ik kan digitale leermaterialen en -hulpmiddelen voorbereiden voor verschillende vakken.
3. Ik kan de instructieactiviteiten van het digitale leermateriaal aanpassen ten behoeve van de student.
4. Ik kan van tevoren een lesplan maken voor digitale leermaterialen.
5. Ik kan passend digitaal leermateriaal selecteren dat past bij een lesonderwerp en het bestaande lesmateriaal.
6. Ik kan de instructietijden, de moeilijkheidsgraad en de methoden van het digitale leermateriaal aanpassen op basis van de evaluatie die voortkomt uit het digitale lesmateriaal.
7. Ik kan mijn studenten beoordelen op basis van meerdere resultaten van digitale leermaterialen.
8. Ik kan met de studenten discussiëren over hun leerresultaten en vervolgens hun toekomstig leren begeleiden.
9. Ik kan aanvullend digitaal leermateriaal verzamelen om de effectiviteit van het lesgeven te verbeteren.
10. Ik kan de werking van het digitale leermateriaal verbeteren met als doel de lesactiviteiten te verbeteren.

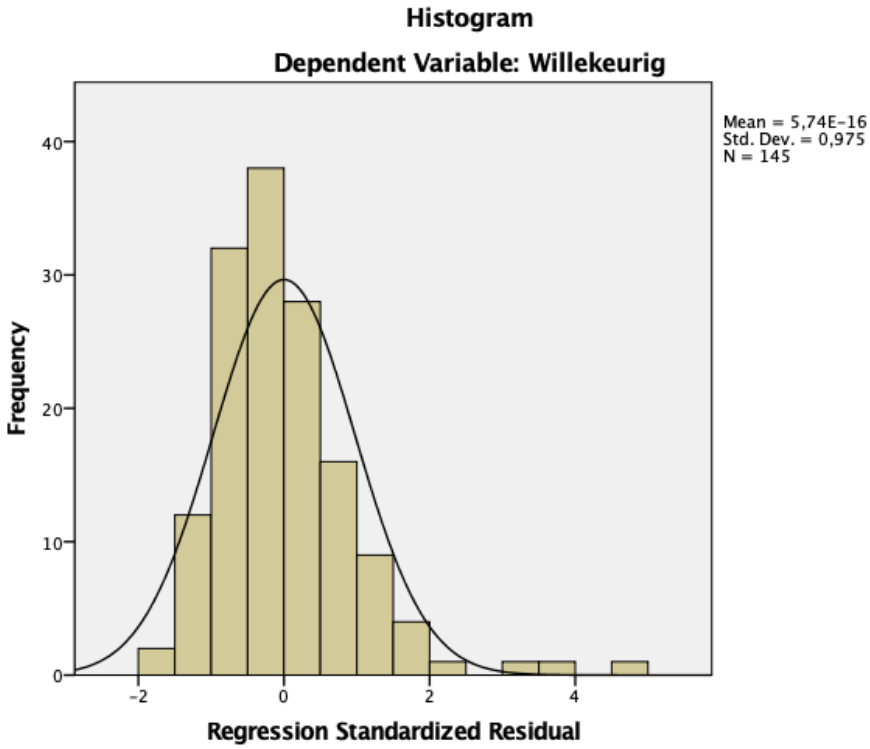
Attachment 7: UBES-9 questionnaire

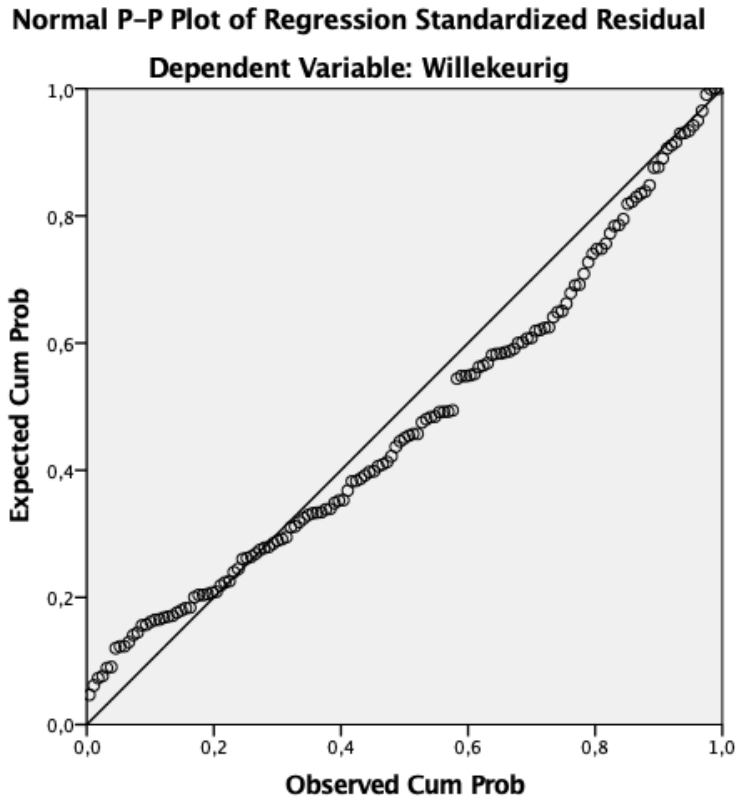
De UBES-9 is een vragenlijst om de bevlogenheid op het werk bij de participant te meten.

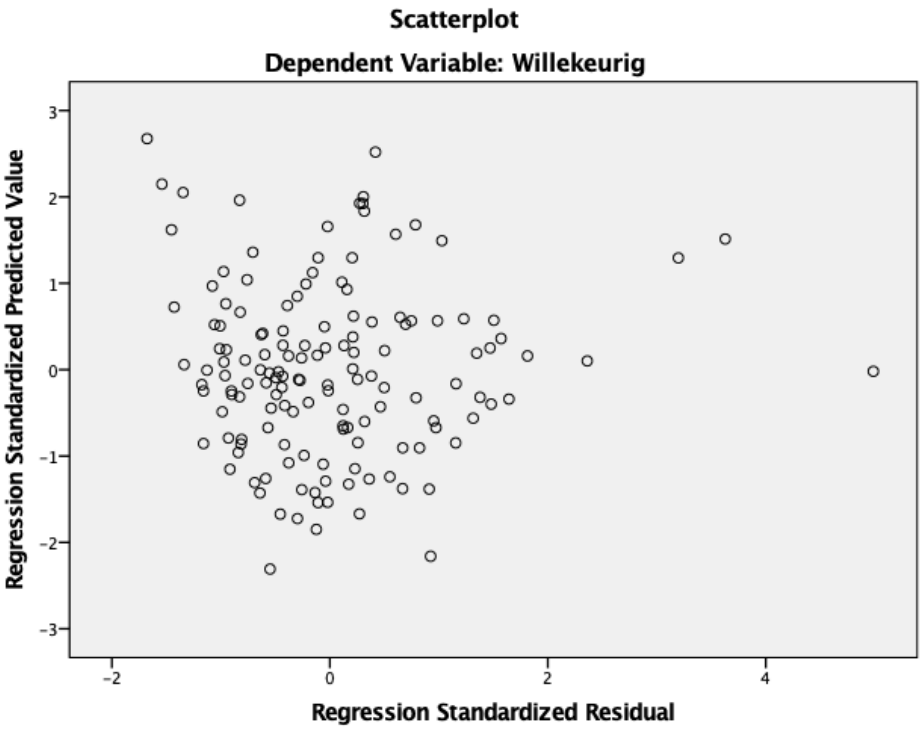
Het laatste blok bevat negen vragen over hoe u uw werk ervaart. U wordt gevraagd in hoeverre de stelling op u van toepassing is. De schaal bestaat uit vijf opties die variëren van helemaal nooit tot altijd.

1. Op mijn werk bruis ik van energie
2. Als ik werk voel ik me fit en sterk.
3. Ik ben enthousiast over mijn baan.
4. Mijn werk inspireert mij.
5. Als ik ‘s morgens opsta, heb ik zin om aan het werk te gaan
6. Wanneer ik heel intensief aan het werk ben, voel ik mij gelukkig.
7. Ik ben trots op het werk dat ik doe.
8. Ik ga helemaal op in mijn werk.
9. Mijn werk brengt mij in vervoering.

Attachment 8: histogram, p-p plot and scatterplot






Scatterplot
Dependent Variable: Willekeurig
Regression Standardized Predicted Value
Regression Standardized Residual
3
2
1
0
-1
-2
-3
-2
0
2
4

Attachment 9: coefficients for collinearity statistics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	12,130	4,587		2,645	,009		
	Big5_Open_Totaal	,757	,382	,168	1,980	,050	,924	1,083
	Big5_Extra_Totaal	-,124	,343	-,030	-,361	,719	,966	1,035
	Big5_Agree_Totaal	-,675	,442	-,132	-1,527	,129	,899	1,113
	Big5_Cons_Totaal	-,980	,606	-,138	-1,617	,108	,917	1,090
	Big5_EmoStab_Totaal	-,238	,348	-,058	-,684	,495	,926	1,080
	WorkEng_Totaal	,759	,463	,140	1,637	,104	,908	1,101
	Totaalscore innovative behavior	-,810	,630	-,111	-1,285	,201	,900	1,111

a. Dependent Variable: Willekeurig